

PROJECT NUMBER: 1720
PROJECT TITLE: Analytical Microscopy
PROJECT LEADER: C. E. Thomas
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PERIOD COVERED: July, 1987

I. STUDIES IN MICROSCOPY

- A. Objective: To obtain structural and chemical information on the morphology of low sidestream cigarette papers.
- B. Results: The above objective has been completed. Data and photographs collected from the papers were presented at the July Richmond meeting by B. Ferguson.
- C. Plans: A special report is in progress.
- D. References:
Baliga, Vicki, PM Notebook #8412, p. 78.

II. STUDIES IN IMAGE ANALYSIS

- A. Objective: Develop procedures using techniques of image processing and analysis for physical measurements of tobacco and related materials.
- B. Results: A method has been developed to measure the density of cocoa shell particles on the surface of burley tobacco after the application of burley spray. The method uses a 1-inch square of adhesive-backed paper to remove the particulates from the surface of a piece of Burley strip. The Intellect 100 image analyzer then quantitates the amount of particulates adhering to the paper.
- C. Plans: This method will be used to study the uniformity of the application of burley spray. The ability to collect a representative sample of the Burley strip after the spray has been applied will be the deciding factor in the usefulness of this method. For this reason the initial studies will concentrate on determining reproducibility on successive samples.
- D. Reference:
Thomas, E., PM Notebook #8502, p. 37.

III. RESPONSE TO ANALYTICAL REQUESTS

- A. Objective: Provide analytical support to R&D.
- B. Results:
Scanning electron microscopy and energy dispersive x-ray spectroscopy were used to determine that a metal piece submitted

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by B. Laroy had an organic coating with small Ca crystals rather than a corrosive metal coating (1).

EDS was used to determine the elemental content of an insoluble material filtered from a solution of potassium triphosphate submitted by J. Allen. The insoluble material contained only the elements P and K (2).

Two Park 500 centrifuge residue samples submitted by J. Allen were examined for Ca and Mg phosphate crystals by SEM and EDS. All crystals analyzed which contained Ca also contained Mg (3).

Light microscopy was used to examine a broken ceramic garniture part submitted by W. Sanderson. It was determined that stress caused the part to break and that a small inclusion in the break was secondary to fracture (4).

At the request of S. Ganeriwala Marlboro and Winston polypropylene cigarette-package overwraps were examined by polarized light microscopy. Both were birefringent but the Winston overwrap had a slightly different orientation from the Marlboro overwrap (5).

A cigarette paper from an unknown sample was examined for surface structure and elemental composition by SEM and EDS at the request of R. Comes. The paper was perforated with a series of holes in parallel lines running the length of the cigarette. The holes were about 30-40 μ in diameter and appeared to be burned through the paper. The significant elements observed were Mg, K, and Ca with concentrations distributed as shown below.

<u>Element</u>	<u>Inside of paper, %</u>	<u>Outside of paper, %</u>
Mg	16	18
Ca	1	2
K	1	1

The above concentrations are very close to P6SU and P6SW, both low sidestream papers with 35 and 40% Mg(OH)₂ respectively, 5% CaCO₃, and 4.5% K acetate. Close examination of the fibers showed a coating on the fibers similar to the Mg(OH)₂ coating found on the Mg(OH)₂ containing papers (6).

C. References:

1. Sanders, K., PM Notebook #8374, pp. 120-121.
2. Sanders, K., PM Notebook #8374, p. 118.
3. Sanders, K., PM Notebook #8374, pp. 124-129.
4. Sanders, K., PM Notebook #8374, p. 119.
5. Baliga, V., PM Notebook #8412, p. 77.
6. Baliga, V., PM Notebook #8412, pp. 77, 79.

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